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THE NORTHEASTERN MINNESOTA FOREST FIRES OF OCTOBER 12, 1918*

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Compared with other great conflagrations of historical record, the fires which swept over northeastern Minnesota during the afternoon and night of Saturday, October 12, 1918, will easily take rank among those of exceptional character as to area, rapidity of travel, loss of life and property, and general devastation in the regions affected.

THE BURNED AREAS AND THE LOSSES

In this most recent of Minnesota's holocausts over 8,000 square miles were affected, and approximately 2,000 square miles of territory, mainly within a radius of 50 to 100 miles of Duluth, were more or less completely burned over, including great tracts of forest—mostly second growth and consisting largely of white pine, tamarack, and birch, as well as vast quantities of cord wood—farm buildings, settlers' homes, whole villages and one small city, suburban portions of Duluth, and summer homes or cottages and hunting and fishing lodges in the outlying districts. These burned sections (see map, Fig. 1) include parts of St. Louis, Carlton, Pine, Aitkin, Itasca, Cass, and Crow Wing Counties, together with tracts adjoining Superior in Douglas County, Wisconsin, opposite the southwestern suburbs of Duluth. The greatest damage occurred in St. Louis and Carlton Counties. The following places were either ravaged somewhat or partially or wholly destroyed: Adolph, Aitkin, Arnold, Autumba, Bain, Brookston, Bruno, Caribou Lake, Cloquet, Cloverton, Corona, Cromwell, Exeter Farms, Five Corners, Floodwood, Fond du Lac Indian Reservation, Grand Lake, Harney, Hermantown, Kettle River, Lakewood, McGregor, Maple Grove, Moose Lake, Munger, Pike Lake, Saginaw, Sturgeon Lake, Tamarack, Twig, Wawini, and Willow River, while the affected suburbs of Duluth included most of northwestern Woodland, the Calvary Road district, and portions of Lakeside and Lester Park. Nearly 400 persons lost their lives, about 2,000 were more or less seriously burned, and about 13,000 rendered homeless. The loss of live stock was heavy, while the property losses (including several million feet of standing timber, largely second growth, as stated) may reach or exceed \$25,000,000 in value, nearly \$4,000,000 of the losses occurring in St. Louis County, probably not more than one-fourth of the total being covered by insurance. It will require a painstaking and expert survey ex-

* A brief preliminary note (with map) on this conflagration, based on the newspaper reports of the time, was published in the December, 1918, *Review* (pp. 513-514). The presented extended account and detailed map (Fig. 1) are based on the accurate data since become available.—EDIT. NOTE.

tending over many months definitely to establish the figures. A fair estimate of the property loss can be based on the statements made by local officials of the Relief Commission at the time to the effect that approximately \$5,000,000 would be needed properly to meet the requirements of temporary assistance and probably \$20,000,000 for a semblance of permanent rehabilitation. Between 40,000 and 50,000 persons were affected in one way and another by the fire.

CHARACTER OF THE FIRE

At the outset it must be borne in mind that this was not merely one great fire, but fifty to seventy-five or more which united to a considerable extent, were fanned to huge proportions by the wind, and then, with the increasing energy developed by the consequent violent air movement attending rapid combustion on such an enormous scale, advanced over vast areas with almost incredible speed.

PREDISPOSING FACTORS

For some days before the great fires in question there had been numerous brush and peat-bog fires burning over limited patches. These were directly traceable to various causes, such as carelessness on the part of campers, automobilists, and train crews and on the part of farmers and settlers in burning brush to clear land. Such fires are quite common to this section, especially during the dry periods in summer and autumn, and the public in general does not ordinarily regard them seriously. The conditions which favored the full development of the great fires were primarily those of drought (the season being the driest for 48 years) and the fresh winds that occurred on October 12.

GENERAL METEOROLOGICAL CONDITIONS

Except for the continuance of the dry weather the general meteorological conditions on the morning of October 12 were not unusual for the season. The weather map, based on the 8 A. M. observations of that date (Fig. 2), showed a low barometric pressure area of moderate strength centered over western Ontario, the inclosing isobar being 29.6 inches (corrected to sea-level pressure), and an area of high barometer of 30.2 inches extending from Wyoming, Utah, and Nevada to Washington, so that the air-pressure gradient was by no means extraordinary. Fair weather and winds from westerly directions, fresh or moderately strong (about 30-mile an hour rates), were indicated, and in addition a "small craft" wind warning was ordered displayed on western Lake Superior at 10:30 A. M. All of this was given the usual publicity.

WIND VELOCITIES AT DULUTH

At Duluth the weather was clear until about 12:30 P. M., when smoke began moving in from westerly sources; but, because of the occasional

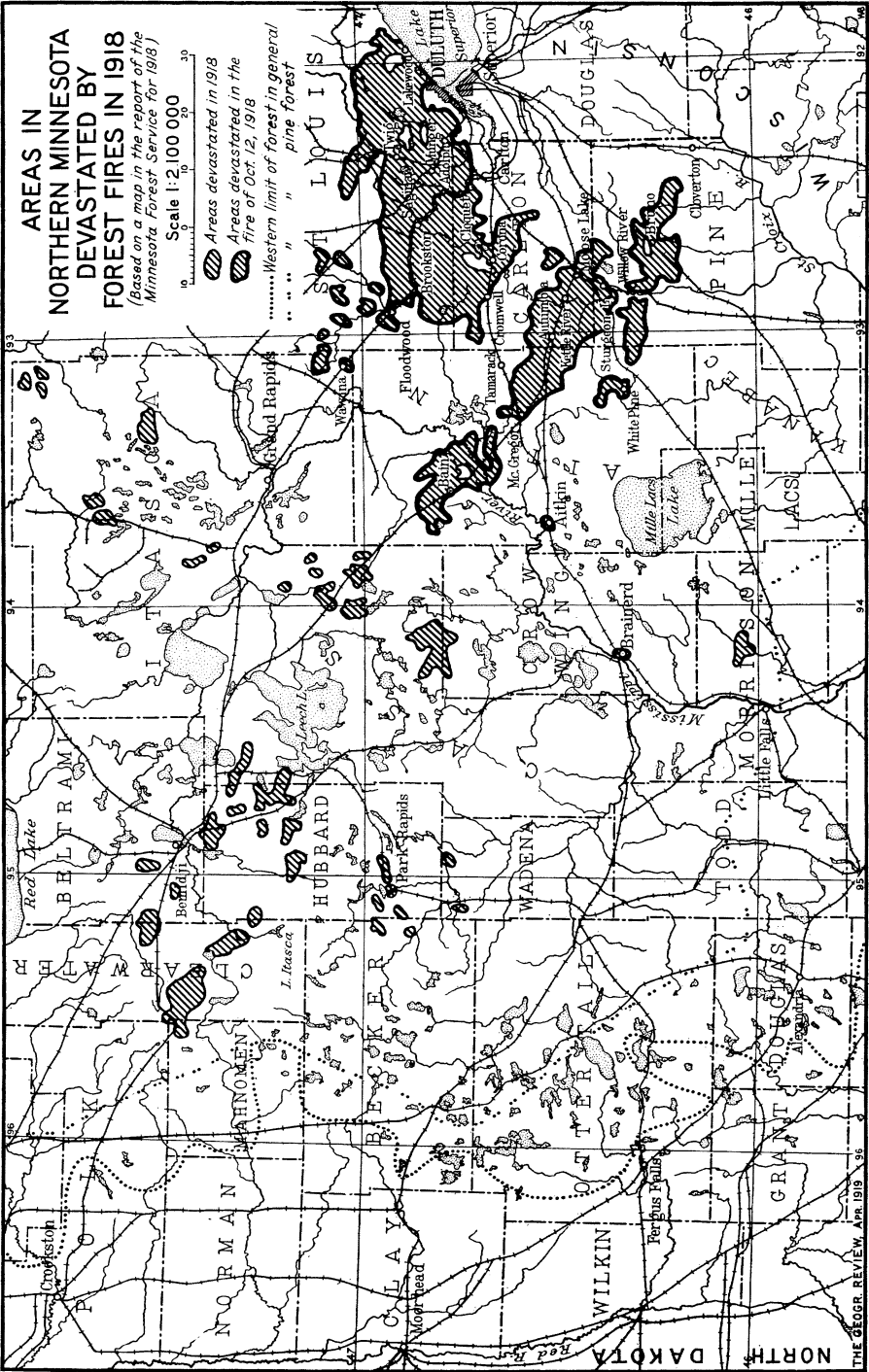


FIG. 1.—Map of northern Minnesota showing the areas devastated by forest fires in 1918. Scale, 1:2,100,000. The western forest limits are based on a map by Upham and Butters (reproduced in *Minnesota Geol. Survey Bulls. 12 and 13, 1915 and 1917*).

previous occurrence of such a condition, the smoke attracted little attention. After 2:30 P. M. it increased considerably, the sun appearing red or being altogether obscured most of the time thereafter—a manifestation common to fires of unusual character. The wind gradually increased also, reaching 30 to 40-mile rates from the west at times until about 3 P. M. (Fig. 3). After that hour there was a steady rise to gale proportions, 50 to 60-mile rates from the west-southwest-northwest occurring between 4:15 P. M. and 9 P. M. After this hour the wind continued at 40-mile velocities until about

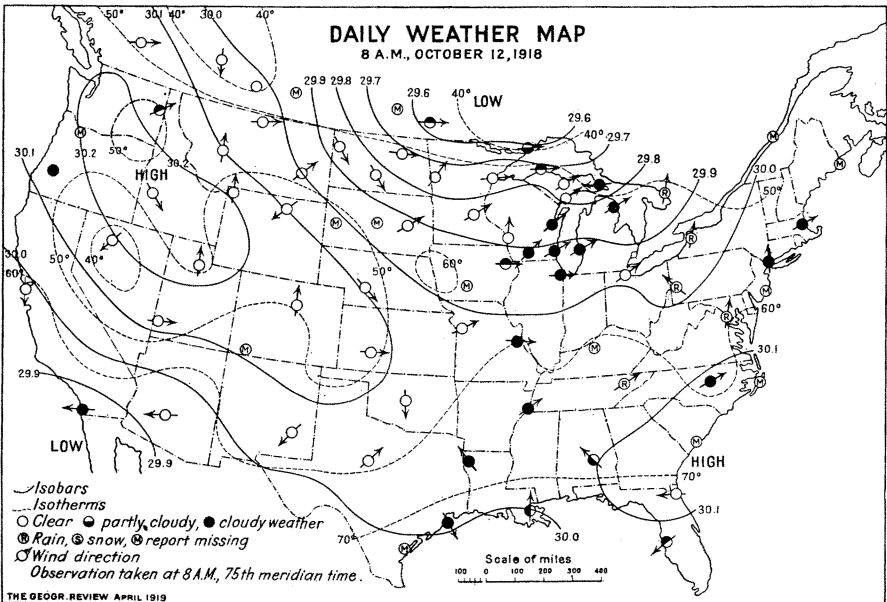


FIG. 2—Copy of the daily weather map of the U. S. Weather Bureau for October 12, 1918, issued at Duluth, Minn. Scale, 1:42,000,000.

2 A. M. of the 13th, subsiding materially thereafter. The highest 5-minute rate was 65 miles an hour from the west at 5:52 P. M., while the extreme speed for a less period was 76 miles about that time.

THE FIRE AT DULUTH AND ITS ENVIRONS

Between 4 P. M. and 5 P. M. very dense volumes of smoke drifted rapidly in from the west, showing that fires of marked intensity and extent were occurring in the vicinity. Between 4 P. M. and 6 P. M. rather alarming reports began to reach Duluth. In spite of all this many people left about that time for week-end visits to cottages on nearby lakes or cabins in clearings. Occasionally during the late afternoon and far into the night the dense smoke¹ showed deep red color at points from south by way of west

¹ For an account of the diffusion of the smoke clouds from the Minnesota forest fires over a large portion of the United States east of the Missouri River, see the note under "Geographical Record" in this issue.—EDIT. NOTE.

to north. About 5:30 P. M. realization of the danger began to dawn when authentic news of disaster in adjoining districts began reaching the city. Brookston (about 35 miles west of Duluth) was destroyed at 4 P. M., and after the belated report of this calamity events moved swiftly. Telephone and telegraph lines to the southwest, west, and northwest were more or less demoralized or down by 6 P. M. and generally so after that hour.

At 6 P. M., as fires were beginning to menace Woodland (a northern suburb of Duluth), the fire department called upon the military forces for help in fighting the fire and in rescue work. By 7 P. M. companies A, B, C, and D of the Home Guard, C and D of the 4th Minnesota Infantry, and A and B of the Motor Corps were fully mobilized and in action. They were assisted by thousands of volunteer citizens, many of them aiding with their automobiles. All night long these men and also many women toiled with the utmost energy and fortitude, rescuing the helpless, fighting fire, and saving property where possible. Many of the soldiers continued on duty from 36 to 48 hours without rest, and for nearly two weeks hundreds of them kept up the work of rescuing life, guarding property, and patrolling the fire zone.

Unlimited praise is due the soldiers, motor corps, train crews, and volunteer citizens. The whole country was searched for days as thoroughly as practicable. Otherwise thousands of people would have perished. The automobile rescue work on the night of the 12th was rendered especially hazardous by reason of the necessity of speed at a time when even to use lights was almost futile because of the dense, suffocating, and blinding smoke and the flying sparks and brands. Quite often there would be flames on both sides of the road. Many accidents were caused by collisions and ditching of automobiles. Many of the rescuers had to abandon their cars and flee for their lives. Fully one hundred automobiles were thus destroyed, and a very large number were badly damaged. Some of the relief trains also ran through sections where there were roaring and terrifying conflagrations on all sides. There were innumerable instances of the most splendid heroism and the noblest self-sacrifice. No danger was too great. It was a sublime exemplification of true Americanism in a time of gravest peril.

There were all kinds of alarming rumors, of course; but it was well established by midnight of the 12th that huge sections of the neighboring country were in flames or already in ashes and that many towns and villages had been damaged if not wholly destroyed, with consequent loss of life.

EXPLANATION OF FIG. 3—The vertical lines indicate 5-minute intervals. The dots in the upper part of each of the two sections of the record show the direction from which the wind was blowing each minute, the level of the dot-lines (defined by the letters N. E. S. W.) indicating the components of the four points of the compass which went to make up the wind direction at a given moment. The wind velocity is shown in the dentated line in the lower part of the record, each dentation representing a velocity of one mile within the time indicated. The hand-written figures in the velocity record show the total number of miles recorded in the hour and the maximum velocities, respectively. Maximum velocities are for 5-minute periods, and rates less than 30 miles per hour are not indicated in this case. As the time is indicated for both direction and velocity it is easy to associate the two. Note the high velocities between 5.35 P. M. and 9.00 P. M., on October 12, especially near 6.00 P. M.

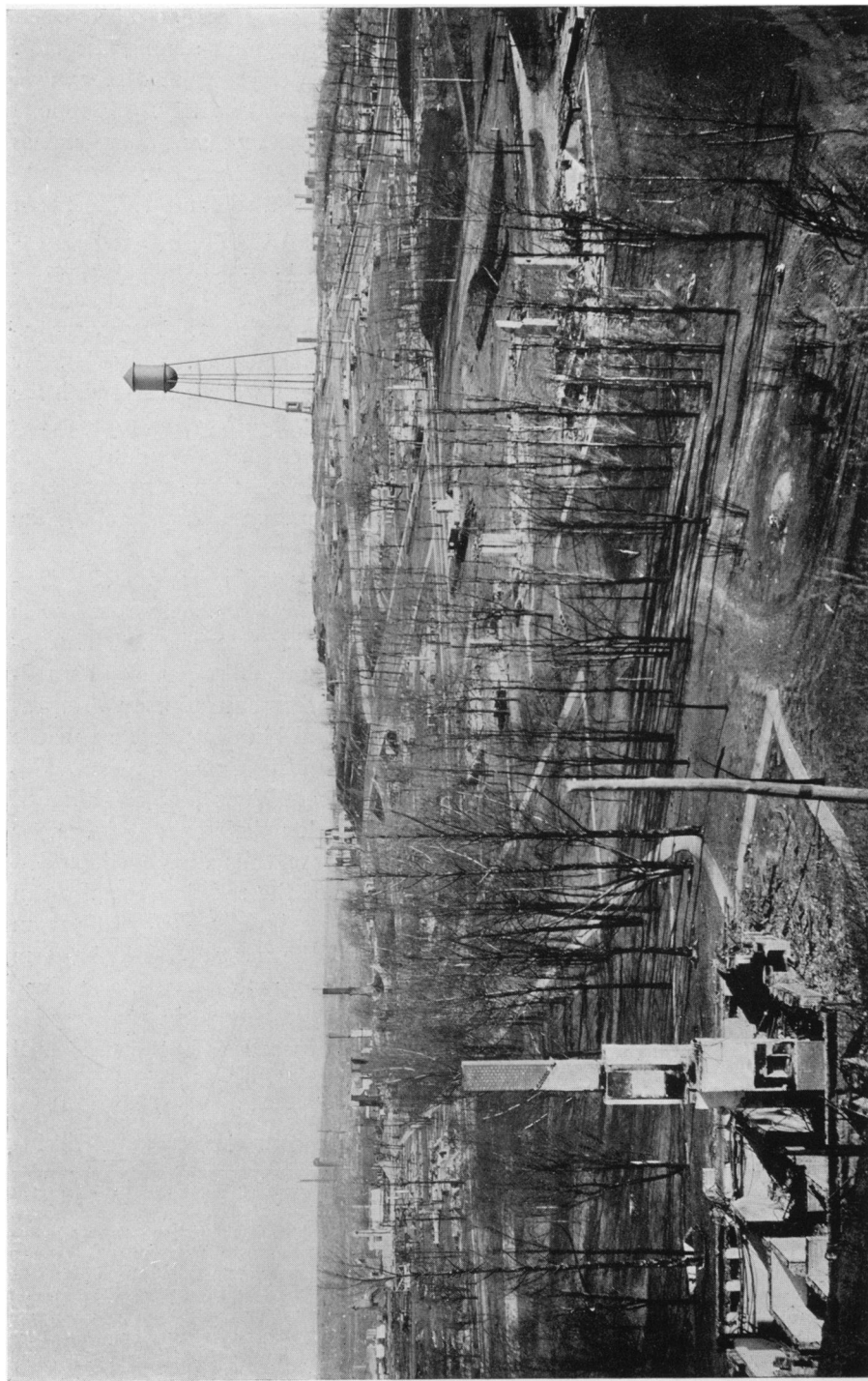


FIG. 4—Partial view of Cloquet, Minn., showing completely devastated residence district as it appeared two days after the fire of October 12, 1918. A portion of the destroyed business section appears in the distance at the left. (Photo by H. McKenzie.)

EXTENT AND NATURE OF THE DEVASTATION

The various fires traveled fast, as much as 15 to 20 miles an hour and at even higher speed in some cases. At Moose Lake the fire frontage was about 7 miles in extent, at Arthyde 3 miles, at Corona 4 miles, and at Cloquet 6 to 8 miles, while near Duluth from west to north and including the northern suburbs there was an irregular frontage of fully 10 miles. Occasionally vast billows of detached flame would leap across rivers, streams, small lakes, roads, and other open spaces in front of the walls of fire. An interesting feature observed in a few instances was that, as the main fires advanced or moved about, there were back-firing effects which eventually caused some of them to die out. This was a phenomenon attending the fire itself and has no reference to the methods of back-firing usually practiced. Human efforts of this sort were generally unavailing during the worst of the fire storm, but where such work was done sufficiently in advance it was fairly effective. The greatest devastation occurred during the height of the 50 to 60-mile westerly gale, between 4 P. M. and 9 P. M.

Moose Lake, in Carlton County, about 50 miles southwest of Duluth, had probably the largest proportionate loss of life, 200 being burned to death in that locality. Later 87 charred bodies (many unidentified) were interred there in one large trench grave.

Cloquet (8,000 population), in Carlton County, about 25 miles west-southwest of Duluth, suffered the most complete fire loss. The property destruction in the residence and business sections was practically total (Fig. 4), but most of the lumber and paper mills remained without serious damage. A remarkable feature is that but five lives were lost in what constituted the city limits. By the quick action and good management of the railroad people and prominent citizens practically the whole population was safely moved out in about two hours, mostly to Duluth and Superior. Passenger coaches, box cars, flat cars, and coal cars were utilized and made up in several long trains, the cars being packed to capacity and their occupants carrying little or no baggage. The station was in flames as the last train departed. Great numbers also left in automobiles and other conveyances and even on foot, taking the road to Carlton, six miles distant, which proved a safe refuge. Fully one hundred lives were lost in the district adjacent to Cloquet.

Settlers and farmers and townspeople saw the product of their years of toil and thrift swept away in a few moments. Thousands of prosperous citizens were rendered destitute. This was quite the common experience, although some were fortunate in having insurance. In spite of all the misery and loss a fine courage and a general optimism prevailed, and re-establishment was soon progressing.

LOSS OF ANIMAL LIFE

The dairy interests suffered enormous loss. Large numbers of horses, cattle, pigs, poultry, dogs, and wild game such as deer and rabbits, were

burned, and even fish in some of the shallower streams are reported killed. Free veterinary aid was furnished to injured stock as far as practicable. In some of the outlying settlements timber wolves were later reported as becoming numerous and destructive to remaining and unprotected live stock.

DAMAGE TO ROADS

Immense damage resulted to roads—especially those crossing marshlands, peat bogs, and muskegs. A vast number of bridges and culverts had to be replaced. The need of such repairs greatly retarded relief work. Rural mail routes were disorganized and service could only gradually be resumed.

HUMAN TRAGEDIES

The pitiful tragedies and thrilling escapes reported were so numerous that any attempt at detailed description of them would fill a volume. In some instances whole families lost their lives; in others the parents were survived by the very young; or in still others only the very old or the crippled or the badly burned were saved. There were numerous instances of premature childbirth, sometimes under most distressing circumstances, and literally hundreds of similar heartrending experiences. In one case a man lost his wife, his children, and all his immediate relatives—a total of 18 persons; all were buried in one grave. The fires came so swiftly that many people escaped only after the most heroic efforts and terrifying hardships. Scores saved themselves by plunging into lakes and streams or by lying face downward in ditches or other depressions. Many such were almost suffocated by the smoke or were badly burned; others were actually drowned; and still others were first suffocated and then burned beyond identification. Some victims were actually burned to death while asleep in their beds.

For the most part the damage in the burned areas was in the nature of annihilation. The desolation was of an altogether weird and depressing character, reminding one of Doré's illustrations of Dante's Inferno.

FREAKS OF THE FIRE

The fires played strange tricks. On one side of a road there would be nothing but a charred tangle of fallen or partly fallen tree trunks, or a mass of ashes extending for miles with here and there a stump or boulder showing, while on the opposite side for the distance of a mile or more trees and shrubbery and grass would be untouched. A house and barn would be burned to ashes while between the two might stand an undamaged haystack. Occasionally houses were left intact while all around would be desolation; or perhaps one small area of forest might be left inviolate while for miles in all directions nothing but burned waste could be seen. In some cases in the thoroughly burned districts poultry, pigs, dogs, cattle, or horses

would be found wandering disconsolately about the ruins of their former comfortable domiciles. How under the circumstances any of these animals escaped unscathed is one of the mysteries.

RELIEF MEASURES

The fire situation was well in hand by October 14, and on the 19th copious rains effectually disposed of smoldering embers which had continued a menace.

The rescue and relief measures were immediate; they were exceptionally well organized, splendidly generous, and sympathetic. The temporary relief included a rationing scheme for the sufferers and for live stock, supplies of fuel, and even moderate sums of money regularly furnished. Thousands of articles of clothing and household and farm equipment were distributed, all free. This work was carried on by the Relief Commission under the direct supervision of the Red Cross, with headquarters at the Armory in Duluth, while other organizations rendered splendid service of the same kind in co-operation with the Red Cross. Hundreds of the simplest form of emergency houses and barns, and in some instances community barns, were built. After the fire a hundred or more automobiles and autotrucks were engaged in searching the countryside for casualties and for people in distress. Thousands of bushels of potatoes were dug and stored, and much temporary shelter construction was done by volunteers. Every effort was made to provide employment for the vast number of refugees. Arrangements were also begun to procure seed either free or at cost to settlers and farmers for spring planting. The subjects of abatement of taxes and re-establishment of land surveys and titles likewise received attention from the authorities.

EFFECT OF THE FIRE ON THE SOIL

In the opinion of local authorities, men of long experience and practical knowledge of similar events, the recent fires have done little if any damage to the soil. The prevailing idea is that the large quantities of burned vegetation (especially wood, on account of its potash content) will be beneficial rather than harmful, particularly where the burning was rapid and not too deep, and that the extensive and thorough burning will facilitate land clearing. Commenting upon the idea among settlers that peat lands are improved by burning and that this belief is the cause of many settlers' fires, an official of the Forest Service of the U. S. Department of Agriculture states that fires in peat lands are hard to control and expresses the fear that if these fires are allowed to continue to burn in the peat lands down to the white sands, as was the case in the big fire near McGregor, it will be but a matter of time until Minnesota will have a moving sand-dune problem, like Nebraska.

CAUSE OF THE HIGH WIND

Careful consideration of the available facts seems to warrant the conclusion that the major force of the gale which prevailed during the late afternoon and night of October 12 was fire-created. As has been previously stated, the weather map on the morning of that date apparently favored wind velocities not much in excess of 30-mile rates. But, inasmuch as numerous small fires were then prevailing over extensive but more or less



FIG. 5—Scene near Duluth showing trees uprooted by the fire gale on October 12, 1918. The effect of the various fires was comparable to that of a grate fire of enormous proportions, and in their immediate vicinity there was an accompanying air movement or combusive draft of hurricane force that probably attained a velocity of 80 to 90 miles an hour. Burned residence in middle ground. Distant view obscured by smoke from smoldering debris. Photo taken October 13, 1918, camera facing east-southeast. (Photo by H. McKenzie.)

separated areas, and as the record-breaking drought had caused a tinder-dry condition of vegetation, a wind of any sustained force was all that was required to put into activity a series of united conflagrations that gathered tremendous impetus and quickly thwarted the most desperate attempts at effective control. Reliable reports show that in the immediate vicinity of the big fires the effect was comparable to a grate fire of enormous proportions; that there was an accompanying air movement or combusive draft of hurricane force; that the wind velocity was immeasurably greater in the immediate vicinity of the fires than it was a few miles distant, as in Duluth; and that there was a very noticeable decrease of wind from the fire zone outward. It has been estimated by some that while the wind at the Weather Bureau Station was blowing at the rate of 60 miles an hour it

must surely have been blowing at a rate of 80 to 90 miles adjoining the fire fronts from two to six miles or more distant from the station. There was an attendant deafening roar of fire and wind combined. In numerous instances people were thrown flat on the ground, and some automobiles were overturned by the wind in the vicinity of the fires. There are no authenticated cases of such accidents as these at the time except near the fire fronts. In many instances the rescue automobile engines and radiators were found to be clogged or covered with quantities of sand and gravel blown upon them in the fire districts. This sort of trouble was not experienced elsewhere during that period.

REASONS FOR SERIOUSNESS OF THE FIRE

Indirectly the fire losses of life and property are believed to be largely due to inadequate forest ranger service, overdrainage of swamp lands and the lack of control gates for the drainage ditches, insufficient supervision and control of land-clearing and logging operations (particularly as to brush burnings), insufficient forestry laws and inability to enforce existing laws and to locate and punish offenders, public ignorance of or indifference to forestry laws already enacted, and the difficulty of quickly warning people who live in isolated sections like northeastern Minnesota. The inadequacy of forest fire patrol is illustrated by the fact that, since the state forestry appropriations were reduced by legislative acts in 1915 and 1917, the service in the matter of personnel is so limited that one ranger must patrol from 700 to 1,200 or more square miles, that is anywhere from 20 to 50 townships. And this in an immense section of the state still very largely covered with forest growth and brush, where the cleared areas are generally small in comparison with the surrounding wild country.

NEED OF MORE ADEQUATE FIRE PROTECTIVE MEASURES

As to the security afforded by proper fire patrol the State Forester, in a preliminary report regarding the recent catastrophe, says:

With a sufficient number of rangers to see that burning is done only under proper restriction and control, and to see that any fires which may start accidentally or otherwise are promptly extinguished, there would be no opportunity for a big fire. Even during a high wind the starting of one fire is not likely to destroy a whole community. It is only when a fire has been allowed to burn long enough to attain a wide front, or when a number of small fires are close enough to unite easily, that settlements are seriously endangered. Neither of these conditions should ever exist, but to prevent them requires systematic patrol by a considerable force throughout the danger seasons. During this fire season the few rangers and patrolmen discovered and extinguished hundreds of fires. They arrested 60 persons and convicted 32.

Education, control, and force are needed to effect fire prevention. This of course should include warnings, but even the latter, when issued immediately before great danger of this kind, are usually quite futile, for, sad to relate, people are too often obsessed with a false sense of personal security

and immunity. Warnings, to be properly heeded, should be backed up with some sort of legal or moral penalty. The necessity for systematic propaganda of an educational nature is clearly obvious, especially as to protective measures. Legislative action is needed for more adequate forest ranger service, thorough supervision of brush or land-clearance burnings, and severe and enforced penalties for illegalities.

Last, but not by any means least in importance as a protective measure—possibly one of large pecuniary profit—clover and grass seed should be sown, and sheep and cattle should be put on these lands as fast as practicable. Such animals will not only keep down the weeds and rank grass, which at times are a fire menace, but will also provide wool, leather, meat, and dairy and other products which might easily become an important factor in helping to clothe and feed the world.